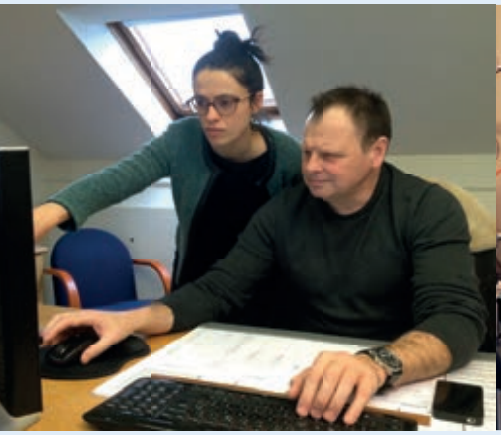
ARMINES

A LEADING INNOVATOR THROUGH COLLABORATIVE RESEARCH

2014 / 2015

MANAGEMENT OF INDUSTRY-RESEARCH RELATIONSHIP



45

permanent staff members in charge of management

- Drafting and management of collaborative contracts directly with industry or funded by national and European agencies.
- Supporting research teams.
- Intellectual property strategy.
- Support roles (HRM, accounting, finance and legal).

PERMANENT STAFF IN RESEARCH CENTRES

231

researchers, research engineers, technicians and administrative staff

- Permanent resources shared with partner schools within joint research centres.
- High-level sustainable skills.
- Cutting-edge technological, metrological and software platforms at the heart of the joint research centres.

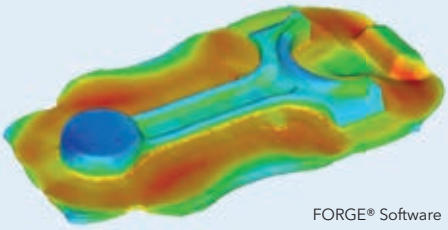
A VEHICLE FOR TRANSFERRING INNOVATION THROUGH SKILLS

280

PhD students, post doctorate fellows and fixed-term contract employees

- Training through research, keeping up with industrial and economic issues.
- Learning a dual culture.
- A springboard for PhD students and post-doctorate fellows.
- A breeding ground for innovation in businesses.

TRANSVALOR, A SUBSIDIARY FOR CREATING RESEARCH-BASED BUSINESS



FORGE® Software

Microeconomix

Geovariances

45

permanent staff members in charge of commercialisation

- Management of technological maturation and industrial and commercial development projects.
- Industrialisation, support and commercialisation of technical and scientific software produced by the research centres.
- Acquiring a stake in and supporting spin-off technologies.

ARMINES

COLLABORATIVE ACADEMIC RESEARCH

From research to technological transfer, nearly 600 private-sector staff members are working on a shared assignment with the Écoles des Mines network.

Controlling energy demand
Smart Electric Lyon is a demonstration project financed by the Agency for the Environment and Energy Management (ADEME) as part of the future investments aimed at designing innovative solutions to dynamically manage energy demand. The MINES ParisTech Centre for Energy efficiency of Systems (CES) contributes to modelling the energy impacts of systems and the management strategies deployed in the field. Project developed by the ***Centre for Energy efficiency of Systems (CES) / MINES ParisTech*** and coordinated by EDF.

Biomass energy recovery
Energy recovery from waste. PREVER technological platform. ***Energy Systems and Environmental Engineering Department (DSEE / MINES Nantes).***

Watch the web-report on www.armines.net

Detection of trace emissions of gas by sensors.
Centre for Chemical Engineering (SPIN) / MINES Saint-Étienne.

Management of brownfield sites.
Centre for Chemical Engineering (SPIN) / MINES Saint-Étienne.

Smart electric grid
NiceGrid - Europe's 1st smart grid demonstrator combined with photovoltaic electricity production and storage using batteries. Battery installation, inverter at the source substation. Project developed by the ***Centre for processes, renewable energies and energy systems (PERSEE) / MINES ParisTech.***

Targeted research to prepare the world of tomorrow

The concept of targeted research was behind the creation of ARMINES in 1967. ARMINES' corporate purpose is to Research and Train "through and using" Research focused towards industry needs.

This purpose is exercised within the context of a shared mission with its partner schools, and first and foremost the Écoles des Mines under the supervision of the French Ministry for Economy, Industry and Digital Affairs.

Today, there are more than 800 new collaborative research contracts per year, and half of our €45 million activity directly with a company. Each year nearly 130 doctoral students supply the socio-economic world with their new skills and know-how, and training initiatives contribute to the improvement of engineers and executives skills in the 48 joint Écoles-ARMINES centres.

Our country needs new ideas and knowledge that can be transformed into new products and services which are more effective and innovative to revive its competitiveness and boost employment. New entities have been created by the public authorities in recent years to strengthen the link between academic stakeholders and companies. All the better for our country if new stakeholders appear to enrich what we have been doing passionately for nearly 50 years through our collaborative projects and which makes us the first Contractual Research Body in France.

Within the landscape of French research, a few characteristics differentiate us in a unique way compared to other stakeholders, in terms of added value for our partners:

• **The "Écoles-ARMINES" public-private partnership** which enables us to be responsive and manage autonomously to recruit staff members who complete the schools human resources capped by the State's resources. We can thus quickly bring together the skills required for the best project team to meet the needs of the company.

• **Completion of "Écoles-ARMINES" resources** which makes it possible to closely link high-level scientific skills and technological application platforms (experimental, metrological, software) worked on by permanent qualified staff which enables us to go from the idea through to the pilot proof-of-concept, thus enabling companies to remove part of the risk before setting their Product development in motion.

• **The entrepreneurial spirit** of our centre leaders who combine scientific excellence within teams which are internationally recognised with consideration for socio-economic needs.

In 2014 our Institut Carnot M.I.N.E.S prepared the response to the call for "Industrial Sector" projects and was given coordination of the "Fashion and Luxury" sector at the start of 2015. Our active participation in the 7th European Framework Programme for Research and Technological Development (FP7) has had very positive results with a 27% success rate for the whole period.

Today, our joint mission with the schools continues by cultivating the pro-activeness which companies expect from us.

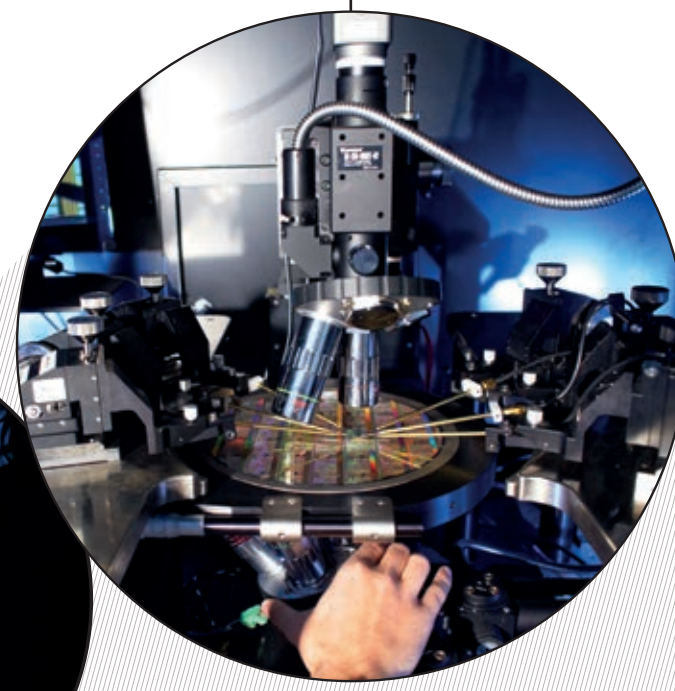
We want to continue to reinforce the strength of collaboration within our network of research centres throughout the territory. This enables us to develop areas which are important for the future such as additive manufacturing, Cloud computing, industry 4.0, or energy transition with even greater value proposition. And this is not just "with and for" the big companies but also the middle-market companies and SMEs too!

Robert Brunck
President

Patricia Renaud
Director

Microelectronics and security.
Advanced laser for security characterisation.
Project developed by the ***Center of Microelectronics in Provence (CMP) / MINES Saint-Étienne***.

Car manufacturing / Robotics and virtual reality
Project developed by the ***Robotics Centre / MINES ParisTech*** in partnership with PSA Peugeot Citroën.



Risks and crises management
Masao Yoshida (center), manager of the Fukushima Dai Ichi nuclear power plant, answers questions from journalists, November 2011.
© Jiji Press Photo Ltd. ***Centre for Research on Risks and Crises (CRC) / MINES ParisTech***.

Watch our web-reports on www.armines.net

Development of a laser for the security characterisation of integrated circuits.
Center of Microelectronics in Provence (CMP) / MINES Saint-Étienne.

Innovative materials for additive manufacturing applied to aeronautics.
Centre of Materials (MAT) / MINES ParisTech.

Publication at Presses des Mines:
"The accident of Fukushima Dai Ichi - story of the event by the plant manager".
Author: Franck Guarnieri, Manager of the Centre for Research on Risks and Crises (CRC) / MINES ParisTech.

ARMINES

An identity based on initiative and accountability

A private-sector organisation dedicated to contract research

ARMINES operates within the framework of the law of 18 April 2006 which allows public sector higher education or research establishments to entrust private-sector organisations with their contractual research activities.

ARMINES is bound by French government-approved agreements to its partner schools, chief amongst them being MINES ParisTech and the Écoles des Mines network under the supervision of the French Ministry for the Economy, Industry and the Digital Sector: Albi-Carmaux, Alès, Douai, Nantes and Saint-Étienne. ARMINES collaborates with laboratories at Polytechnique ParisTech, ENSTA ParisTech, the École Navale and the École des Ponts ParisTech.

Reactivity, proximity and efficiency

With its status as a non-profit making association under the terms of the 1901 law, ARMINES has the managerial autonomy required to act swiftly, thereby empowering the research centres to deal effectively with the economic world: the ability to decide, make commitments and react quickly, unfettered by bureaucratic red tape, allows the organisation to undertake the kind of activity in which researchers must in fact have a free hand.

Staffed by 561 of its own employees, ARMINES assists with the development of research centres it shares with its partner schools.

MORE THAN 47 YEARS
OF COLLABORATIVE RESEARCH AND SKILLS TRANSFER

LEADING
COLLABORATIVE RESEARCH ORGANISATION IN FRANCE

€45 MILLION
OF CONTRACT ACTIVITY IN 2014

A balanced and practical contract model

Contract research is at the heart of ARMINES' skills. The partner businesses provide financial support which covers a share of the full costs of projects. The contracts are not services but part of a public-private technical-economic partnership.
This set of circumstances creates reciprocal rights and obligations for the company and the research centre:

- The right to exploit results within the areas where each partner may lawfully act,
- The right to publish and support theses,
- The legal sharing of intellectual property for the purpose of developing a coherent intellectual heritage and a capacity for each partner to progress in their own field.

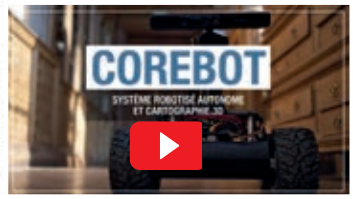
All of these provisions allow the principle of open innovation to flourish in a win-win scenario.
One of ARMINES' missions is to monitor the quality of this balance on a contract by contract basis.

New materials/Sensoriality
Analysis of the psycho-sensory properties of materials. Project developed by the ***Centre for Materials Science and Mechanical Engineering (SMS) / MINES Saint-Étienne*** and Renault.

Aeronautics
Air Cobot, autonomous navigation and non-destructive inspection of aircraft on the ground. Joint research project led by ***Institut Clément Ader (ICA) / MINES Albi*** and Airbus.

Watch the web-reports on www.armines.net

The result of an industrial and scientific partnership in the field of consulting.
Centre of Industrial Engineering (CGI) / MINES Albi - Carmaux.



3D mapping using an autonomous robotic system.
Centre of Robotics / MINES ParisTech.

Organisations and industrial processes
Physical Internet, worldwide deployment of an efficient and sustainable logistics network. The European Modulushca project coordinated by PTV is developed by the ***Centre of Scientific Management (CGS) / MINES ParisTech*** in partnership with GeorgiaTech, the universities of Laval (Québec) and Hong Kong, Procter & G amble and the Italian postal service.

The research centres

The academic oriented towards industry needs

The ARMINES-schools joint research centres

In keeping with the nature of collaborative research, the operational unit is the research centre, jointly managed by ARMINES and the partner engineering school, where ARMINES makes its own resources available in terms of personnel, investment and day-to-day running, on a scale commensurate with the level of contract income generated.

ARMINES disposes of permanent private sector staff, particularly research engineers, specialized technicians and administrative staff, who complement the public sector employees within the research centres in a form of "functional complementarity" between ARMINES and the schools. This makes robust collaborative research possible and lends cohesion to the whole structure.

Research structured around technological and software platforms

Indeed collaborative research relies for a large part on the implementation and development of scientific results in experimental, measurement, computer science or software platforms, allowing a scientific discovery to be transformed into a result which can be used by industry.

ARMINES also helps bringing in researchers, PhD students and post-doctoral fellows from abroad. In this way it gives the research centres the resources to develop and adapt to their environment.
Each centre has its own specific area of expertise and autonomous scientific management structure whose objective is to keep its annual operating account in balance, while ensuring that its activities are in line with the strategic objectives of the school.

Entrepreneurial simulation

ARMINES therefore has a very flat structure which functions according to the principles of initiative and accountability under demanding economic constraints. For example, taking all expenditure (including payroll) together, some ARMINES-MINES ParisTech joint research centres operate on practically 50% budget funds and 50% contractual resource.

The scientific teams themselves are thus placed in an "entrepreneurial" situation with significant fixed costs not covered by the French government's budget, which constitutes something of an oddity within the French higher education and research landscape.

The balance between training, academic activity and contractual research lies at the heart of the laboratory dynamics.

The joint research teams shared by ARMINES and the schools are active in most fields of engineering science as well as in economics and management

- → Earth and environmental sciences
- → Energy and process engineering
- → Materials science and engineering
- → Mathematics and systems
- → Economics, management, society

Biosourced materials
Minilab processing, analysis and optimisation of the ability to implement new biosourced plastic materials through the methods of plastics processing (ROQUETTE contract + FUI WIBIO project with WIPAK and ROQUETTE in particular) ***Centre of Polymer and Composite Technology & Mechanical Engineering (TPCIM) / MINES Douai.***

CAD view of approximately a hundred small part prototypes of dodecahedral geometry enabling the ***Department of Civil Engineering (GI) / MINES Douai*** to study granular flows for educational purposes.

Watch the web-reports on www.armines.net

Medical imaging at 3 photons with Xenon. Laboratory for Subatomic Physics and Associated Technologies (SUBATECH) / MINES Nantes.

3D Day: challenges and future of 3D printing. Polymers and Composites Technology & Mecanical Engineering Cent (TPCIM) / MINES Douai.

Biomedical and Healthcare Engineering
Automatic system of micro-projection structured light for the in vivo measurement of the micro-relief of human skin without scanning, developed at the ***Centre for Biomedical and Healthcare Engineering (CIS) / MINES Saint-Étienne***, in partnership with the company Peritesco, used in cosmetic tests.

At the heart of the Institut Carnot M.I.N.E.S.*

More than 2,000 research staff including 800 PhD students in the 5 cross-school departments

A collaborative research label

The Écoles des Mines under the supervision of the Ministry for the Economy, Industry and Digital Affairs together with ARMINES constitute the historical group structure of Institut Carnot M.I.N.E.S. The Carnot label, which recognises the capacity of public research organisations to put partnership research at the heart of their strategy, was obtained in 2006. When it was being renewed in 2011, the structure was consolidated by incorporating the École Polytechnique Université Paris Saclay and ENSTA ParisTech laboratories.

A catalyst for scientific resourcing

The direction of an Institut Carnot has a dual purpose:

- to anticipate the needs of companies,
- to reinforce links with private stakeholders in terms of research.

Implementation of the road map is facilitated by an annual contribution from the French national research agency (ANR) which finances:

- scientific resourcing work,
- initiatives to structure partners' research.

The www.carnot-mines.eu website identifies more than 180 skills which are key to the concerns of our partners.

Distribution of scientific skills by field of research and application

	EARTH AND ENVIRONMENTAL SCIENCE	ENERGY AND PROCESS ENGINEERING	MATERIALS SCIENCES AND ENGINEERING	MATHEMATICS AND SYSTEMS	ECONOMICS, MANAGEMENT, SOCIETY
ENERGY & SUSTAINABLE DEVELOPMENT					
CONSTRUCTION		■			
SOURCES OF ENERGY	■	■			■
INFRASTRUCTURES & NETWORKS		■		■	■
MATERIALS FOR ENERGY		■	■		
ENERGY PRODUCTION		■	■		
ENERGY AND CO_2	■	■			
RESOURCES AND ENVIRONMENT					
PETROLEUM	■	■	■	■	■
MINERAL RESOURCES	■		■	■	■
EARTH	■		■	■	
WATER	■			■	
AIR	■	■		■	
SECURITY					
SURVEILLANCE	■			■	
RISK MANAGEMENT	■				■
TRANSPORT					
AUTOMOTIVE		■	■	■	■
AERONAUTICS		■	■	■	
INFRASTRUCTURE				■	
HEALTH					
BIOMEDICAL			■	■	■
BIO-INFORMATICS				■	
HEALTHCARE MANAGEMENT					■
MATERIALS PROCESSING					
PREPARATION		■		■	
CHARACTERISATION	■		■	■	
FORMING			■		
NANO-TECHNOLOGIES		■	■	■	
INDUSTRIAL PROCESSES		■	■		
COMPUTER SCIENCE					
SOFTWARE ENGINEERING				■	
INNOVATION					
INNOVATIVE DESIGN METHOD					■
BUSINESS ORGANISATION					■
SOCIOLOGY					■

Network resourcing: additive manufacturing

In 2014, the contribution from the French national research agency financed a network of seven laboratories (MINES ParisTech, MINES Albi, MINES Douai, MINES Saint-Étienne) based around additive manufacturing technologies. Four families of materials are concerned: ceramics, composites, polymers, metals.
This approach opens up prospects which are inaccessible with traditional technologies (assembly, morphology, manufacturing speed, performance, properties, etc.). The scientists also work on additive manufacturing tools: **instrumentation, optimisation and inspection of manufacturing processes, and digital simulation of processes**.
The ambition is to remove the scientific barriers to accelerate the deployment of these solutions for our partners.

* Méthodes INnovantes pour l'Entreprise et la Société (Innovative methods for Companies and Society)

Maturation, technology transfer and start-up

Transforming research results into innovation: Transvalor's mission

To transform research software into industrial code

ARMINES is the reference shareholder of its subsidiary TRANSVALOR SA which is responsible for converting the research results into innovation.
"Maturation" is the intermediate stage between research and the market.
TRANSVALOR SA fulfils this role either internally or externally by participating in spin-offs based on the technologies of the research centres, predominantly in the field of technical software.
In 2014 TRANSVALOR (staff close to 50 employees) had a turnover of €6.7 million, which mostly came from the industrialisation and commercialization of scientific simulation software for material forming (simulation of forging and casting processes in particular) produced by CEMEF (ARMINES - MINES ParisTech joint research centre) in Sophia Antipolis.
In recent years, this branch of the organisation has seen profitable internal growth thanks to its international success where it has a global distribution network and a subsidiary in the USA (70% of its export turnover).

Delivering results more applicable to Industry

From 2009 on, moreover, TRANSVALOR decided to strengthen the development of new activities originating from the research centres by setting up an Innovation Department responsible for the maturation of the projects.
This internal activity at TRANSVALOR functions as a virtuous circle which has the effect of reinforcing the application of the results by industry and in so doing galvanises the research itself and its socio-economic impact.
Standing out amongst these at the joint research centres with MINES ParisTech are:
• Industrialisation of the SODA web services portal and the HELIOCLIM solar radiation database developed at the O.I.E Centre,
• Fluid transfer simulation in porous environments taking geochemical exchanges into account (CHESS and HYTECH software developed at the Centre for Géosciences),
• Commercialisation of the MORPH-M image analysis software at the Centre for Mathematical Morphology.
In 2014 TRANSVALOR invested heavily in supercomputing and cloud computing to simulate interaction between fluids and structures using a highly innovative fluid-structure simulation model developed at the Centre for Material Forming (CEMEF) (Aéromines project).
For each of these software developments, TRANSVALOR contributes to the development of codes and provides user interfaces and technical support.

Supporting the research centres spin-offs

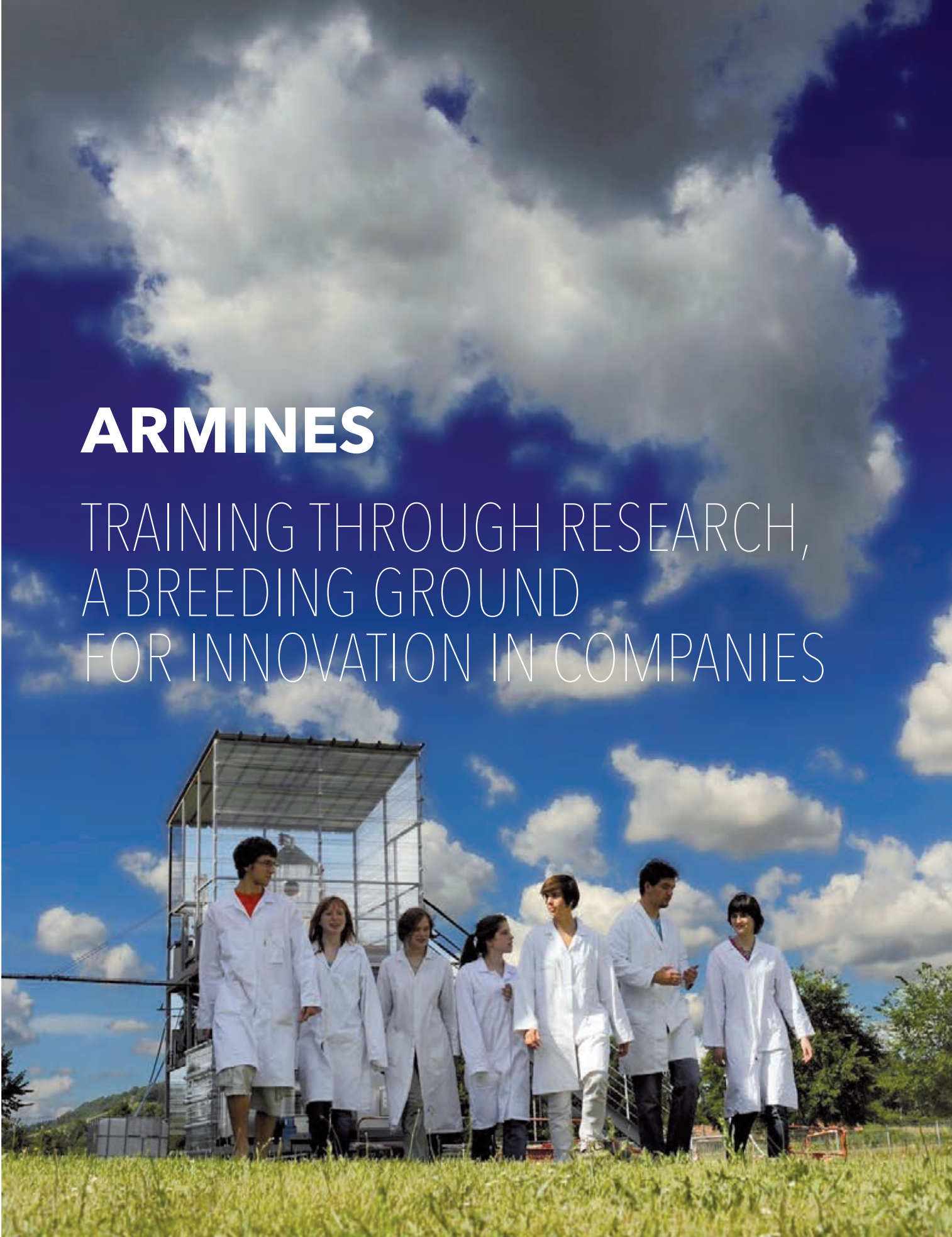
TRANSVALOR uses a proportion of its own capital to provide seed capital in the first financing round.
It is a shareholder in the following companies :
• GÉOVARIANCES (geostatistics, MINES ParisTech),
• MICROECONOMIX (econometrics of competition, MINES ParisTech),
• AI4R (medical imaging, MINES Nantes),
• EAYSVIRT (data centre energy optimisation, MINES Nantes).
In 2014 TRANSVALOR acquired a stake in the Norwegian company CEETRON, a specialist in man-machine interfaces and 3D visualisation of calculation results.

→ **www.transvalor.com**

TRANSVALOR is a shareholder in PERTINENCE INVEST, an investment company created with private "sister" companies (INSAVALOR, INPG ENTREPRISE, CENTRALE INNOVATION, ADERA, ARTS, ADRINORD) to pool financial resources and skills to support start-ups promoting technologies from Engineering schools' and partner universities' laboratories. At the end of 2014, PERTINENCE INVEST took a stake in 9 start-ups.

ARMINES

TRAINING THROUGH RESEARCH, A BREEDING GROUND FOR INNOVATION IN COMPANIES



ON-GOING EUROPEAN PROJECTS

71

ACTIVITY WITH SME

€4.7 M

PATENTS

94

ON-GOING ANR CONTRACTS

269

ACTIVITY

€45,1 M

EMPLOYEES

561

250

PHD & POST-DOCS

48

RESEARCH CENTRES

59

SOFTWARE PROGRAMS DEVELOPED

€5.1 M

ACTIVITY IN EUROPE

77

LICENSES IN USE

FINANCIAL RESULTS FOR 2014

After several years of growth up until 2010, activity decreased slightly in 2011 by around 2% and stabilised in 2012. After a fall of approximately 5% in 2013 linked to the economic crisis, with nevertheless a balanced financial year, activity was slightly up again in 2014.

With total activity of more than €45.1 m and a surplus of €102K, ARMINES has held on to the top spot amongst the private contract research institutions affiliated to higher education establishments at national level.

Collaborative research carried out using public funding, particularly as part of invitations to tender by the French National Research Agency (ANR) and innovation clusters, stands at €12.3 m, or 27% of total income.

Total contracts signed directly with the private sector without public funding still counts for the majority, representing 55% of the total (€24.8 m).

Activity in Europe, affected by the end of the FP7 (7th Framework Programme for Research and Technological Development), represents an activity of €5.1 m or 11% of the total from contracts.

The record of ARMINES' involvement in European projects (FP7 and other European programmes), over the 2007-2013 period, is 121 financed projects including 11 coordinated projects for €34 m funding and a success rate of 27% (European average of 20%). For H2020, 17 projects were obtained in May 2015 including 4 coordinated projects for €8.4 m of funding and a success rate of 20%. Of these 17 projects, 3 ERC (European Research Council) grants were obtained at the École des Mines de Saint-Étienne. "Scientific resourcing" initiatives linked to the labelling of Institut Carnot M.I.N.E.S have remained stable and represent 6% of total activity (€2.8 m).

Our aim in future years is to increase the share of direct industrial contracts and reinforce our mission to contribute to economic development by pursuing the expansion of our industrial partner network to medium sized and innovative small businesses.

2014 FIGURES

COMPARATIVE ACTIVITY

2012: **€47.17 M**
2013: **€44.68 M**
2014: **€45.10 M**

TOTAL ACTIVITY PER PARTNER SCHOOL IN 2014

MINES ParisTech	€26.95 M	59.7%
MINES Douai	€5.14 M	11.4%
MINES Nantes	€3.67 M	8.1%
MINES Saint-Étienne	€2.76 M	6.1%
MINES Albi-Carmaux	€2.47 M	5.5%
MINES Alès	€2.30 M	5.1%
Polytechnique ParisTech	€0.43 M	1%
ENSTA ParisTech (1)	€0.17 M	0.4%
ENPC ParisTech (2)	€0.09 M	0.2%
Navale	€0.03 M	0.1%
Miscellaneous (3)	€1.12 M	2.5%

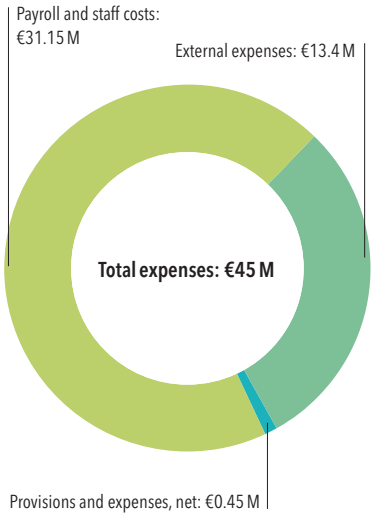
(1) ENSTA ParisTech - (2) École des Ponts ParisTech - (3) including management resources of European consortia

ACTIVITY AT ARMINES / MINES PARISTECH JOINT RESEARCH CENTRES IN 2014

Materials Sciences and Engineering	**€8.69 M**
Materials Centre	€4.80 M
Material Forming Centre	€3.70 M
Solid Mechanics Laboratory	€0.19 M
Earth and Environmental Sciences	**€3.98 M**
Centre for Geosciences	€3.98 M
Mathematics and Systems	**€4.44 M**
Centre for Applied Mathematics	€0.69 M
Centre for Automotion and Systems	€0.23 M
Centre for Computer Science Research	€0.29 M
Centre for Robotics	€1.64 M
Centre for Mathematical Morphology	€0.86 M
Centre for Bio-informatics	€0.73 M
Energy and Process Engineering	**€7.06 M**
Centre for System Energy Efficiency	€3.43 M
Centre for Thermodynamic Process	€0.87 M
Centre for Observation, Effects, Energy	€0.88 M
Centre for Process, Sustainable Energies, Energy Systems	€1.88 M
Economics, Management, Society	**€2.78 M**
Centre for Industrial Economics	€0.33 M
Centre for Science Management	€1.19 M
Centre for Innovation Sociology	€0.41 M
Centre for Risk and Crisis Research	€0.85 M

Évry · Fontainebleau · Palaiseau · Paris · Sophia Antipolis

BREAKDOWN OF EXPENDITURE 2014



NUMBER OF CONTRACTS REGISTERED BY FUNDERS IN 2014 (EXCLUDING CARNOT CONTRIBUTION)

EU contracts: **3**
French government, ANR: **129**
French government agencies, EPICs: **146**
Businesses: **541**
Total: **819**

DISTRIBUTION BY SIZE OF CONTRACT IN 2014

<€10K	2.3%
€20K	7.0%
€40K	17.1%
€75K	32.1%
€150K	59.3%
€300K	84.5%
€500K	93.3%
>€500K	100.0%

STAFF BY SITE

	2012	2013	2014
Paris	81	94	89
Sophia Antipolis	86	72	84
Douai	65	67	57
Fontainebleau	64	64	71
Évry	64	67	65
Nantes	41	42	49
Alès	38	30	36
Albi	35	35	34
Saint-Étienne	31	35	39
Marne-la-Vallée	2	1	1
Pau	3	3	3
Palaiseau	37	34	33
Brest	-	-	-
Total	**547**	**544**	**561**

STAFF AS OF 31/12/2014

General management	50	8.9%
Researchers and engineers*	362	64.5%
Research technicians	92	16.4%
Research administrative staff	57	10.2%
Total staff	**561**	**100.0%**
including, Permanent	276	49.2%
RTC**	133	23.7%
Temporary contracts***	152	27.1%

* Including PhD students and post-doctoral fellows
** RTC: PhD students with research training contracts
*** Temporary contracts: temporary contracts, traineeship, professionalisation contract, salaried trainee

ARMINES, NETWORK PARTNER

AiCarnot: The Association of Carnot Institutes

ARMINES is the body which represents the institut Carnot M.I.N.E.S. (6 Écoles des Mines under the responsibility for the French Ministry for Economy, Industry and Digital Affairs and ARMINES) within AiCarnot (the Institut Carnot association) and has a seat on the Board of Directors.
→ **www.instituts-carnot.eu**

EARTO

ARMINES is one of the 350 members of the European Association of Research and Technology Organisation.
→ **www.earto.eu**

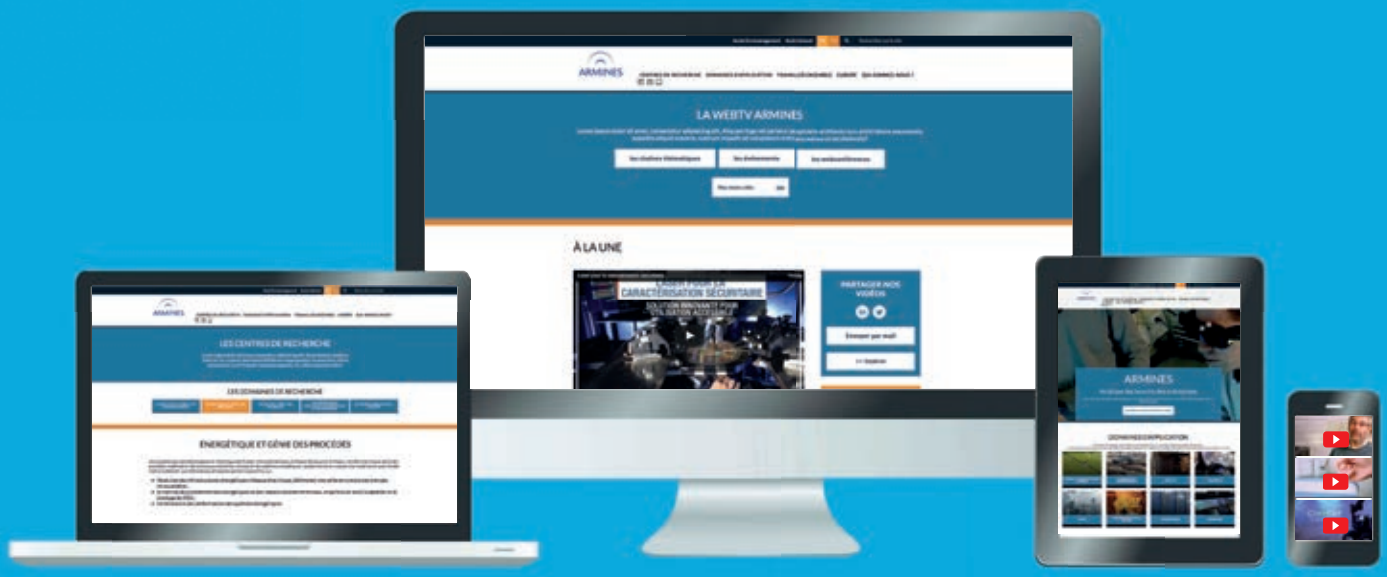
C.U.R.I.E. network

ARMINES is a member of the network which brings together stakeholders involved in the valorization of French public research.
→ **www.curie.asso.fr**

ARMINES is also a member of ANRT, EIRMA (European Industrial Research Management Association) and ASRC.

www.armines.net

More than a hundred reports or evidence-based videos presenting collaborative research



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Front cover
Aéromines®: simulation platform, Cloud computing.
Impliat multi-scale, variational formulation for parallel simulation of turbulent flow with anisotropic grid adaptation.
This technology has been developed by the ARMNES / MINES ParisTech joint research centre CEMEF (Material forming centre) in collaboration with TRANSVALOR. Example of collaboration with TYRIX AEROSPACE.

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